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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

GRAYBILL, DAVID E

ART UNIT PAPER NUMBER

2827

DATE MAILED: 07/18/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/713,848

Applicant(s)

GLENN ET AL.

Examiner

David E Graybill

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 May 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 8.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

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Claims 1 and 3-20 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. The undescribed subject matter is the language "and having a total area less than a total area of said first surface of said image sensor."

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 3, 11, 13, 25, 27 and 29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 3 and 25 the scope of the term "chip size" is unclear because there is no art recognized definition of the term, and the term appears to be a vague relative term of degree for which the disclosure provides no clear standard for measuring the degree, or it is not apparent if the degree is limited by the disclosure, and one of ordinary skill in the art

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in view of the prior art and the status of the art would not otherwise be reasonably apprised of the scope of the term.

In claims 11 and 13 there is ambiguous and confusing literal antecedent basis for the term "said pad." Specifically, antecedent basis can be found in both the terms "bond pad" and "electrically conductive pad."

In claims 27 and 29 there is insufficient antecedent basis for the language "the area of said window" and "the area of said first surface of said image sensor."

In claim 29 the limitation "the area of said window in a plane parallel to said first surface of said image sensor being less than the area of said first surface of said image sensor in said plane" is incompatible with the limitations "a plurality of electrically conductive bumps electrically and physically connecting said bond pads to said interior traces." Specifically, at least the traces, pads and bumps separate the area of the window and the first surface of the image sensor; therefore, the area of the window in a plane parallel to the first surface of the image sensor and the first surface of the image sensor cannot be in the same plane.

Claim 29 has not been rejected over the prior art because, in light of the 35 U.S.C. 112 rejections supra, there is a great deal of confusion and uncertainty as to the proper

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interpretation of the limitation of the claim; hence, it would not be proper to reject the claims on the basis of prior art. As stated in *In re Steele*, 305 F.2d 859, 134 USPQ 292 (CCPA 1962), a rejection should not be based on considerable speculation about the meaning of terms employed in a claim or assumptions that must be made as to the scope of the claims. See also MPEP 2173.06.

In the rejections *infra*, reference labels are generally recited only for the first recitation of identical claim language.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to

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point out the inventor and invention dates of each that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-15, 20-23, and 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Takase (5463229) and Glenn (6291884).

At column 2, lines 29-32, column 14, line 66 to column 16, line 5, column 16, lines 43-45, column 17, lines 8-17, column 18, lines 40-64, column 28, line 65 to column 29, line 1, column 30, lines 10-11 and 34-44, and column 30, line 65 to column 31, line 5, Takase teaches the following:

1. A structure comprising: an image sensor 16 having an active area and a bond pad on a first surface of said image sensor; a window 1 having an interior surface and an exterior surface opposite said interior surface, said interior surface of said window facing said first surface of said image sensor; and an electrically conductive via 20 extending through said window from said interior surface to said exterior surface of said window, said via being electrically connected to said bond pad.
4. The structure of 1 wherein said active area is responsive to radiation, said window being transparent to said radiation.

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5. The structure of 1 further comprising: an electrically conductive interior trace 2 on said interior surface of said window; and an electrically conductive bump 16b electrically connecting said bond pad to said interior trace.

6. The structure of 5 wherein said interior trace is a land aligned with said via, said bump and said bond pad.

7. The structure of 5 wherein said interior trace is a metallization extending along said interior surface of said window.

8. The structure of 5 wherein said via is offset from said bump, said interior trace extending along said interior surface of said window to electrically connect said via to said bump.

9. The structure of 1 further comprising an electrically conductive exterior trace 3 on said exterior surface of said window, said exterior trace being electrically connected to said via.

14. The structure of 1 wherein said window includes a central region and a peripheral region, said central region being aligned with said active area, said via being formed within said peripheral region.

15. The structure of 14 further comprising a bead 16b contacting said first surface of said image sensor and further contacting said peripheral region of said window, said bead forming a seal

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between said peripheral region of said window and said image sensor.

20. The structure of 1 further comprising an image sensor substrate comprising said image sensor.

21. An image sensor package comprising: an image sensor having an active area and bond pads on a first surface of said image sensor; a window mounted to said image sensor, said window having an area less than an area of said first surface of said image sensor; a plurality of electrically conductive interior traces on an interior surface of said window; a plurality of electrically conductive bumps electrically and physically connecting said bond pads to said interior traces; a plurality of electrically conductive vias extending from said interior surface of said window to an exterior surface of said window, said vias being electrically connected to said interior traces; and a plurality of electrically conductive exterior traces on said exterior surface of said window, said exterior traces being electrically connected to said vias.

22. The image sensor package of 21 wherein said window comprises a central region aligned with said active area and a peripheral region, said interior traces, said vias and said exterior traces being formed within said peripheral region.

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23. The image sensor package of 22 further comprising a bead forming a seal between said peripheral region and said image sensor.

26. The image sensor package of 21 further comprising an image sensor substrate comprising said image sensor.

27. An image sensor package comprising: an image sensor having a bond pad on a first surface of said image sensor;
a window having an interior surface; an electrically conductive interior trace on said interior surface of said window; and an electrically conductive bump electrically connecting said bond pad to said interior trace.

However, Takase does not appear to explicitly teach the following:

1. A structure comprising a window having a total area less than a total area of said first surface of said image sensor.

3. The structure of 1 wherein said structure is a chip size image sensor package.

10. The structure of 9 further comprising an electrically conductive pad on said exterior trace.

11. The structure of 10 wherein said exterior trace is a land aligned with said via and said pad.

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13. The structure of 10 wherein said via is offset from said pad, said exterior trace extending along said exterior surface of said window to electrically connect said via to said pad.

21. An image sensor package comprising a plurality of electrically conductive pads on said exterior traces; and a plurality of electrically conductive interconnection balls on said pads.

27. The area of said window being less than the area of said first surface of said image sensor.

28. The structure of 10 further comprising an electrically conductive interconnection ball on said pad.

Nonetheless, at column 3, lines 24-31 and 47-51, and column 10, line 21 to column 12, line 11, Glenn teaches a structure comprising an electrically conductive pad 231 on an exterior trace 230, the exterior trace is a land aligned with a via 242 and the pad, the via is offset from the pad, the exterior trace extending along the exterior surface 227 of a circuit substrate 226 to electrically connect the via to the pad, a plurality of electrically conductive pads on the exterior traces, and a plurality of electrically conductive interconnection balls 236 on the pads, the area of the circuit substrate being less than the area of the first surface ^{207?} ~~227~~ of a semiconductor device 204, wherein the structure is a chip size package.

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Moreover, it would have been obvious to combine the product of Glenn with the product of Takase because it would enable package fabrication in wafer form and reduce manufacturing cost.

Also, in the combination, Takase teaches the following:

12. The structure of 10 wherein said exterior trace is a metallization extending along said exterior surface of said window.

Claims 16-19, 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Takase and Glenn as applied to claims 1-15, 20-23, and 26-28, and further in combination with Glenn (5949655).

As cited supra, Takase teaches the following:

16. The structure of 15 wherein said window, said bead, and said image sensor define a cavity.

However, Takase does not appear to explicitly teach the following:

16. The structure of 15 wherein said window, said bead, and said image sensor define a sealed cavity.

24. The image sensor package of 23 wherein said bead has sides coplanar with sides of said image sensor.

Nonetheless, at column 1, lines 39-45, column 3, lines 54-60, and column 5, lines 3-18, Glenn '655 teaches wherein a bead 22, and an image sensor 10 define a sealed cavity 19, and an

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image sensor package wherein a bead has sides coplanar with sides of an image sensor. Moreover, it would have been obvious to combine the invention of Glenn '655 with the invention of Takase because it would provide a protective seal.

Also, in the combination of Takase, Glenn and Glenn '655, Takase teaches the following:

17. The structure of 16 wherein said active area is responsive to radiation, said cavity containing a medium transparent to said radiation.

18. The structure of 17 wherein said medium is air.

19. The structure of 17 wherein said medium is an encapsulant
10.

Applicant's amendment and remarks filed 4-25-02 have been fully considered, and are addressed in the rejection supra and are further addressed infra.

Applicant traverses the 35 USC 112, second paragraph rejection of claims 3 and 25 for the recitation of the term "chip size," and cites a portion of the disclosure in order to support this traversal. However, applicant's traversal is respectfully deemed to be unpersuasive because applicant merely cites without further elucidation, and the citations do not otherwise appear to support the traversal.

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In particular, the cited portion recites, "this allows image sensor package 100 to be the size of image sensor 102, i.e., image sensor package 100 is chip size." However, there is no disclosed nexus between the size of the image sensor and the size of a chip. Furthermore, the size of the image sensor package cannot be determined because applicant has not disclosed the size of the image sensor or the size of a chip. In addition, the cited passage appears to be incompatible with the entirety of the original disclosure. Specifically, applicant discloses that the image sensor package 100 comprises image sensor 102, window 110 and additional elements. Therefore, the image sensor package size must be larger than the image sensor. Indeed, the drawings illustrate that the image sensor package comprises the window and additional elements, and is larger than the image sensor.

Also, applicant cites particular portions of the disclosure in order to support the claim 1 limitation that the interior surface of the window has, "a total area less than a total area of said first surface of said image sensor."

However, it is respectfully submitted that these cited passages do not support the limitation. To further clarify, it is noted that there is no literal support in the cited passages,

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and the passages are not otherwise commensurate in scope with the limitation.

The prior art made of record and not applied to the rejection is considered pertinent to applicant's disclosure. It is cited primarily to show inventions similar to the instant invention.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any telephone inquiry of a general nature or relating to the status (MPEP 203.08) of this application or proceeding should be directed to Group 2800 Customer Service whose telephone number is 703-306-3329.

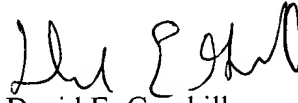
Any telephone inquiry concerning this communication or earlier communications from the examiner should be directed to David E. Graybill at (703) 308-2947. Regular office hours: Monday through Friday, 8:30 a.m. to 6:00 p.m.

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The fax phone number for group 2800 is 703/308-7722.

A handwritten signature in black ink, appearing to read 'David E. Graybill', written in a cursive style.

David E. Graybill
Primary Examiner
Art Unit 2827

D.G.

11-Jul-02